

**Attachment 4**

**ESP Operating data for 5/6 12:06 PM, 5/7 12:36 AM, 5/7 2:30 AM, 5/8 1:30 AM, 5/8 3:00 AM, 5/8 6:54 AM**

**AVC Voltage Trends**

**Dust Density Reading Trends**

**ESP ID Fan Trends**

**Spraywater Data**

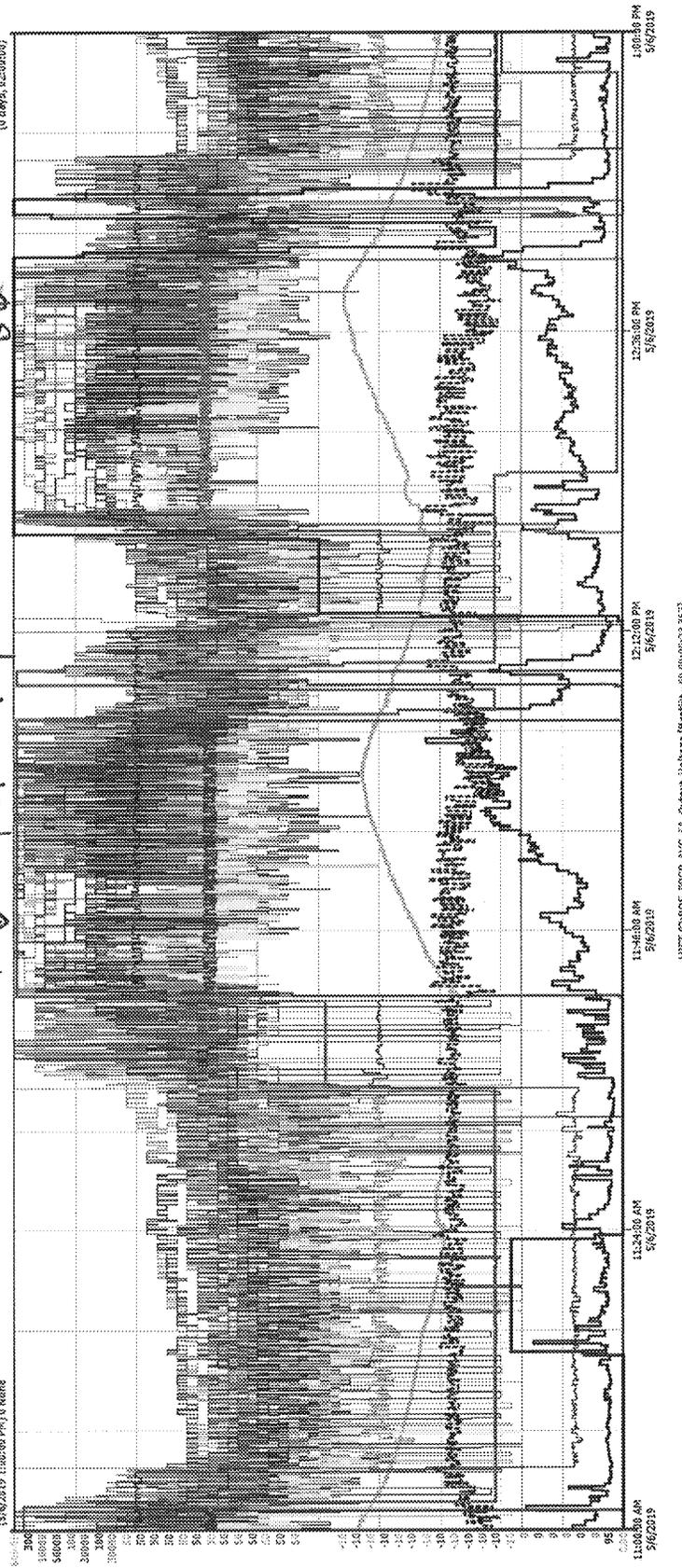
**Shift Check sheet**

**Operator check sheet for 6-Minute greater than 15% Average**

AVC Voltages: 5/6 1100AM - 5/6 100PM

Yellow = No. 6A A-Vessel = Orange Balls  
 Red = 1A B-Vessel = Blue Balls  
 Grey = 3A B ↓

AVC Voltage HISTZ  
 A ↓ Opacity



Tag Name	Description	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset
<input checked="" type="checkbox"/> 005 BOF_PROC_AVC_5_6C_Output_Voltage	Precipitator Automatic ...	HIST-02	None	None	-10	50	110.20.83.96DAS3BC...	000000...
<input checked="" type="checkbox"/> 005 BOF_PROC_AVC_3_6C_Output_Voltage	Precipitator Automatic ...	HIST-02	None	None	-10	50	110.20.83.96DAS3BC...	000000...
<input checked="" type="checkbox"/> 005 BOF_PROC_AVC_5_3E_Output_Voltage	Precipitator Automatic ...	HIST-02	None	None	-10	50	110.20.83.96DAS3BC...	000000...
<input checked="" type="checkbox"/> 005 BOF_PROC_AVC_3_3E_Output_Voltage	Precipitator Automatic ...	HIST-02	None	None	-10	50	110.20.83.96DAS3BC...	000000...
<input checked="" type="checkbox"/> 005 BOF_PROC_AVC_3_6C_Output_Voltage	Precipitator Automatic ...	HIST-02	None	None	-10	50	110.20.83.96DAS3BC...	000000...

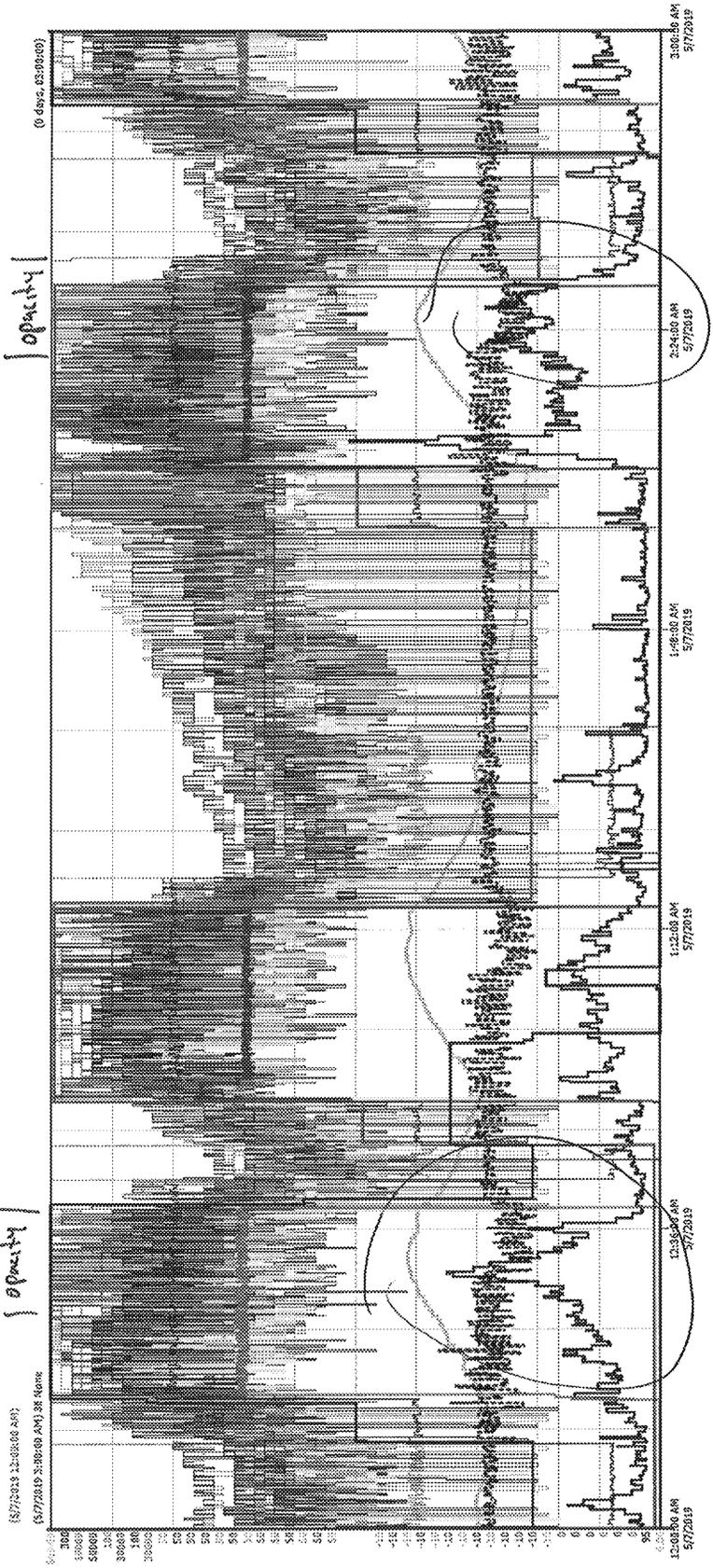
Conclusions: C500s, 1A, 3A, 6A strussling with primarily 3  
 and 8 experiencing high levels of coating causing high dust density.  
 Not Vessel Specific; No Fan Issues, Root Cause Unknown  
 1A/3A/6A All strussle Last 2/3 of heat  
 Some trend on following heat where opacity was ok  
 C5 00s - Issue on A/V

7/18/2019 5:49:25 PM

C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\AVC Voltage HIST2.aaTrend

Avc Voltages : 5/7 1200AM - 5/7 300AM

Avc Voltage HIST2



Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> BDF-PRCP_AVC_5_5C_Output_Voltage	Predicator Automatic ...	HIST-02		None	-10	50	\\10.20.83.95\QASABC...	0:00:00...
<input checked="" type="checkbox"/> BDF-PRCP_AVC_5_5E_Output_Voltage	Predicator Automatic ...	HIST-02		None	-10	50	\\10.20.83.96\QASABC...	0:00:00...
<input checked="" type="checkbox"/> BDF-PRCP_AVC_5_6E_Output_Voltage	Predicator Automatic ...	HIST-02		None	-10	50	\\10.20.83.97\QASABC...	0:00:00...
<input checked="" type="checkbox"/> BDF-PRCP_AVC_5A_Output_Voltage	Predicator Automatic ...	HIST-02		None	-10	50	\\10.20.83.98\QASABC...	0:00:00...
<input checked="" type="checkbox"/> BDF-PRCP_AVC_5B_Output_Voltage	Predicator Automatic ...	HIST-02		None	-10	50	\\10.20.83.99\QASABC...	0:00:00...

General Struggle with 1A, 3A, 6A  
1AV, 1BV

7/18/2019 5:50:06 PM

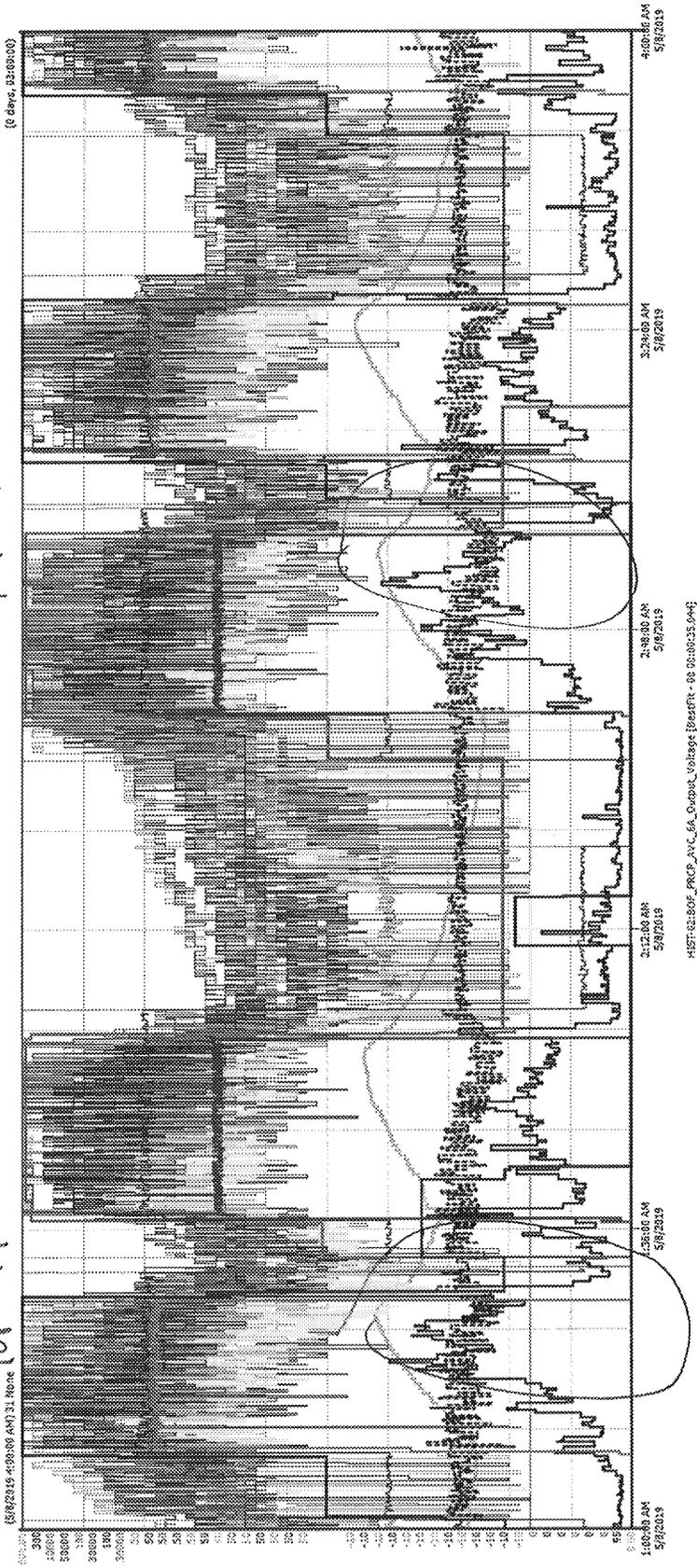
C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\Avc Voltage HIST2.aaTrend

Avc Voltages : 5/8 100AM- 400AM

AVC Voltage HIST2

Opacity |

Opacity |



Tag Name	Description	Server	Color	URLs	Minimum	Maximum	IO Address	Time Offset
<input checked="" type="checkbox"/> 001	ProcInstor Automatic ...	HIST-02		None	-18	50	110.20.83.96/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 002	ProcInstor Automatic ...	HIST-02		None	-10	50	110.20.83.96/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 003	ProcInstor Automatic ...	HIST-02		None	-10	50	110.20.83.96/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 004	ProcInstor Automatic ...	HIST-02		None	-10	50	110.20.83.96/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 005	ProcInstor Automatic ...	HIST-02		None	-10	50	110.20.83.96/DASABC...	0:00:00...

1A, 3A, 6A Frnsle  
1A on A, 1 on B

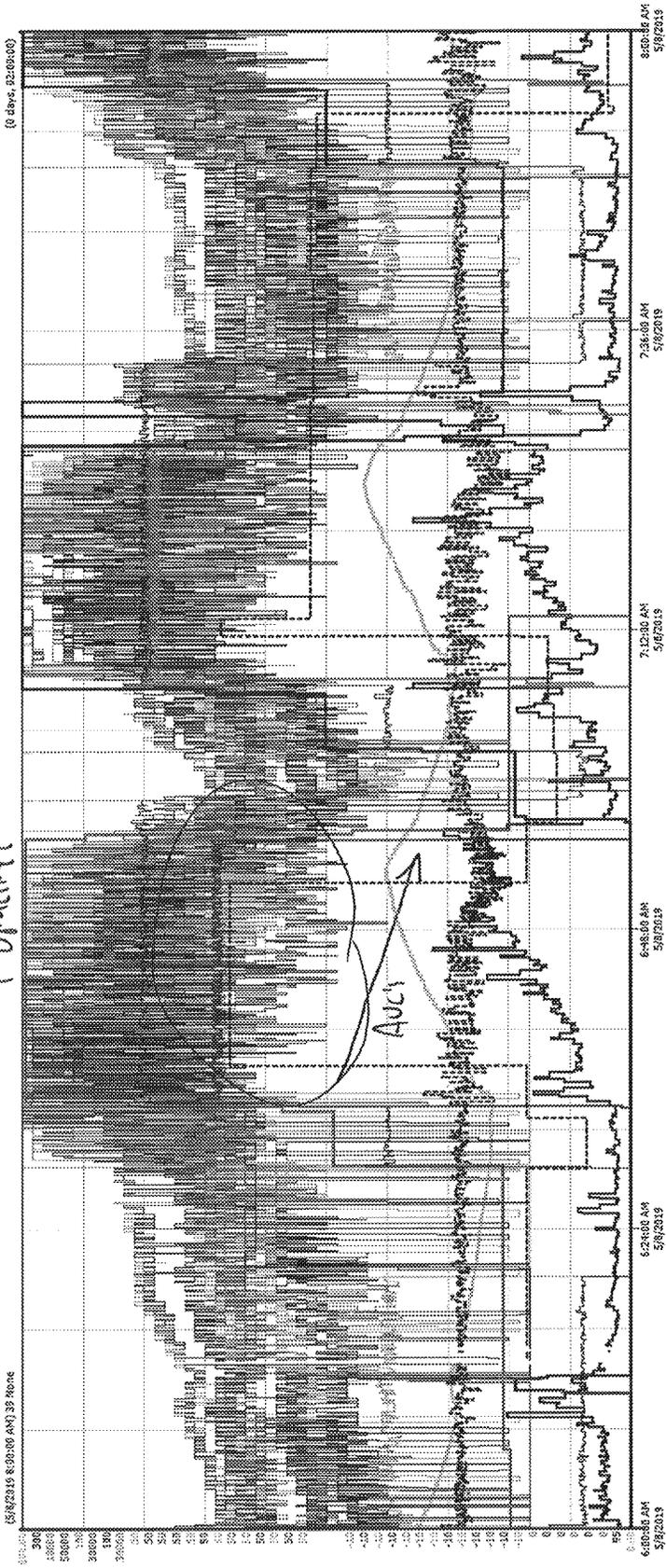
7/18/2019 5:50:39 PM

C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\AVC Voltage HIST2.a Trend

AUC Voltage: 5/8 600 AM - 800 AM

AVC Voltage HIST2

Opacity



Tag Name	Description	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset
<input checked="" type="checkbox"/> 305 PRCP_AVC_5_5C_Output_Voltage	Predictator Automatic ...	HIST-02		None	-18	50	110.20.83.95/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 306 PRCP_AVC_5_5E_Output_Voltage	Predictator Automatic ...	HIST-02		None	-10	50	110.20.83.95/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 307 PRCP_AVC_5_5E_Output_Voltage	Predictator Automatic ...	HIST-02		None	-10	50	110.20.83.95/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 308 PRCP_AVC_5A_Output_Voltage	Predictator Automatic ...	HIST-02		None	-10	50	110.20.83.95/DASABC...	0:00:00...
<input checked="" type="checkbox"/> 309 PRCP_AVC_5B_Output_Voltage	Predictator Automatic ...	HIST-02		None	-10	50	110.20.83.95/DASABC...	0:00:00...

All AUC's show general decline  
but 1A struggles most → A/V Heat

7/18/2019 5:51:15 PM

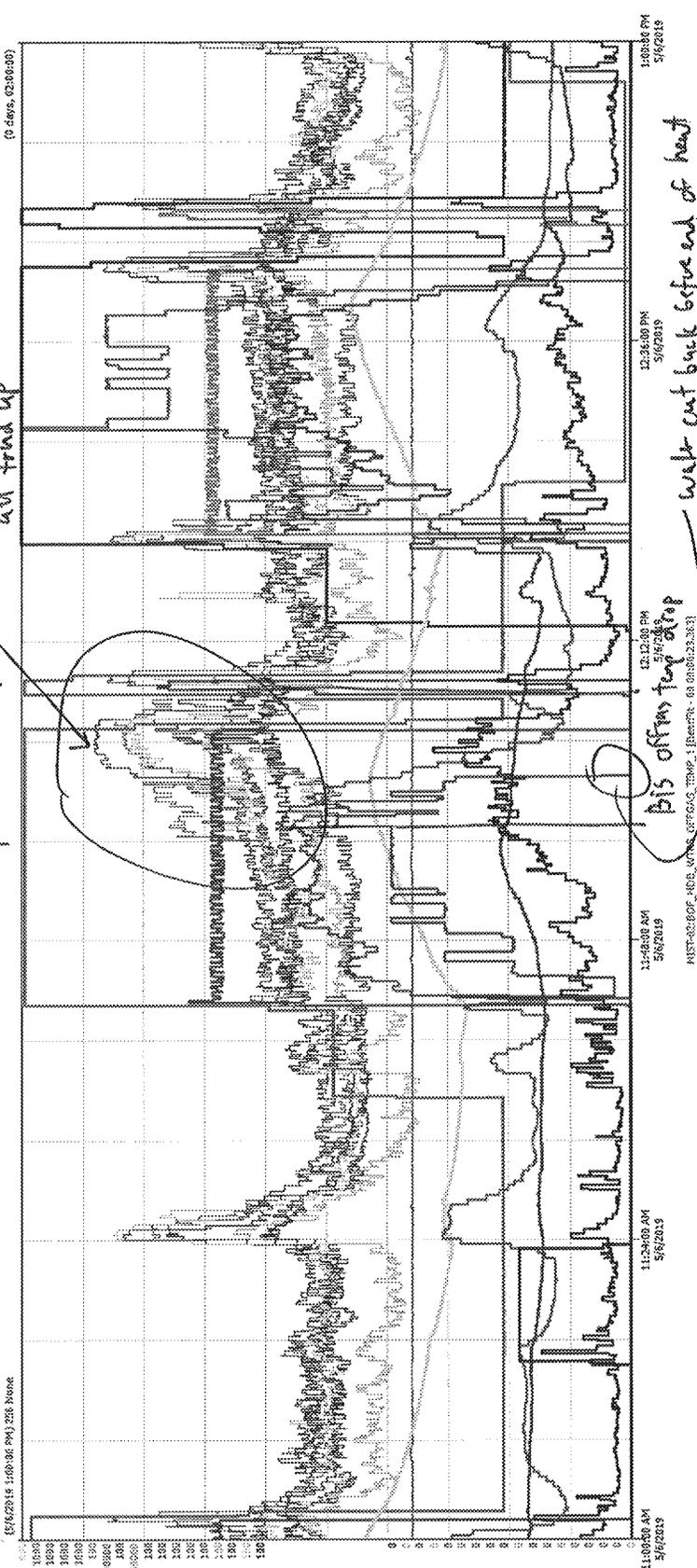
C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\AVC Voltage HIST2.aa Trend

Dust Density Levels: 5/6 1100 - 5/6 1300

3 = Green  
 4 = Light Blue  
 8 = Brown

Several DD Spikes  
 3/4, 8 mostly but  
 all trend up

Dust Density HIST2  
 Opacity



Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> 303 ROF_H04_MTR5_OFFGAS_TEMP_1		HIST-02		None	0	1000	110.20.83.94DAS8RT...	0:00:00...
<input checked="" type="checkbox"/> 303 ROF_H04_MTR5_SPRAY_WATER_FLOW	'A' Vessel Spray Water ...	HIST-02		None	0	1000	110.20.83.94DAS8RT...	0:00:00...
<input checked="" type="checkbox"/> 303 ROF_H08_MTR5_OFFGAS_TEMP_1		HIST-02		None	0	1000	110.20.83.94DAS8RT...	0:00:00...
<input checked="" type="checkbox"/> 303 ROF_H08_MTR5_SPRAY_WATER_FLOW	'B' Vessel Spray Water ...	HIST-02		None	0	1000	110.20.83.94DAS8RT...	0:00:00...
<input checked="" type="checkbox"/> 303 ROF_H00A_M PrimaryDampenFusion	Analog Feedback 'A' Ve...	HIST-02		DEGREES	0	1000	110.20.83.94DAS8RT...	0:00:00...
<input checked="" type="checkbox"/> 303 ROF_H00B DocumentTemp_EK	Vessel 'A' Cool Down SCE...	HIST-02		None	0	1000	110.20.83.94DAS8RT...	0:00:00...

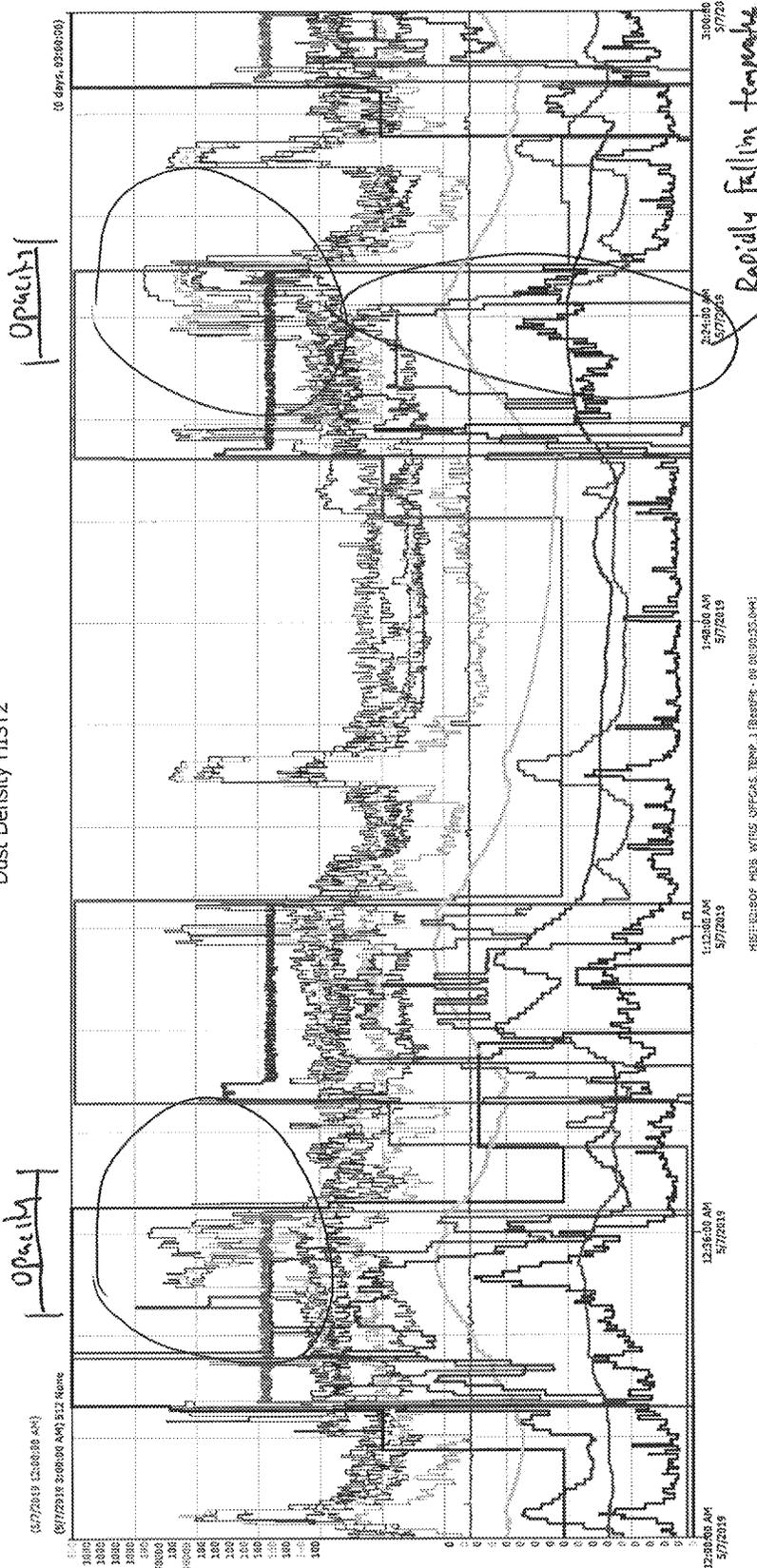
All DD elevate 2nd Half Heat  
 with 3/4/8 Reacting the most

7/18/2019 5:59:04 PM

C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\Dust Density HIST2.aatrend

Dust Density Levels: 5/7 1200AM - 5/7 300AM

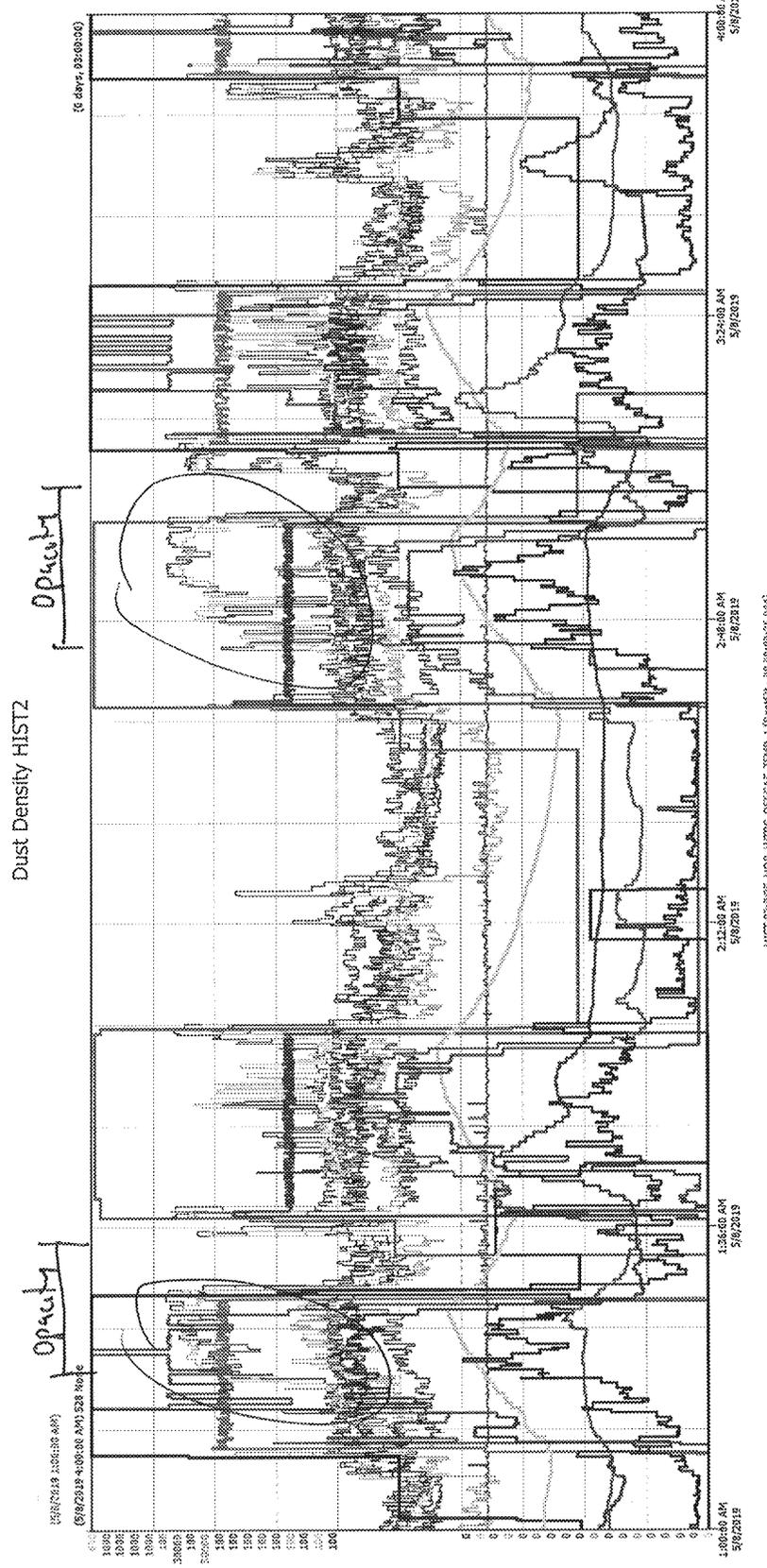
Dust Density HISTZ



Tag Name	Description	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset
<input checked="" type="checkbox"/> 001 EOP_H0A_WTRIS_OFFCAL_TEMP_1	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 002 EOP_H0A_WTRIS_SPRAY_WATER_FLOW	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 003 EOP_H0B_WTRIS_OFFCAL_TEMP_1	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 004 EOP_H0B_WTRIS_SPRAY_WATER_FLOW	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 005 EOP_H0CA_WTRIS_OFFCAL_TEMP_1	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 006 EOP_H0CA_WTRIS_SPRAY_WATER_FLOW	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 007 EOP_H0CB_WTRIS_OFFCAL_TEMP_1	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 008 EOP_H0CB_WTRIS_SPRAY_WATER_FLOW	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 009 EOP_H0CC_WTRIS_OFFCAL_TEMP_1	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> 010 EOP_H0CC_WTRIS_SPRAY_WATER_FLOW	HIST-02	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...

Dust Density Activity mainly on 3/4/8 2m Half Heat

Dust Density Levels: 5/8 100AM - 5/8 400AM

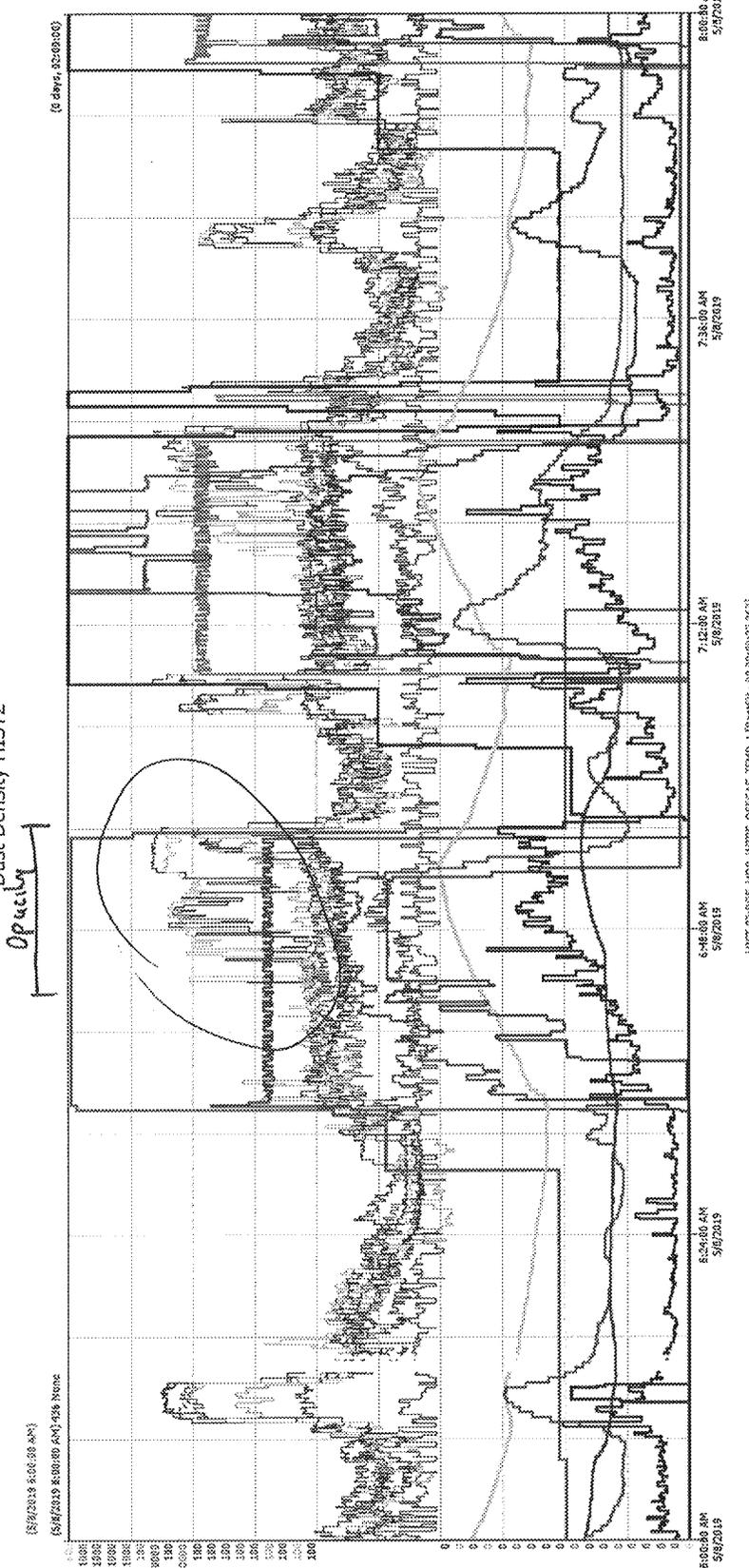


Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> ROF_H04_MTRG_OFFGAS_TEMP_1		HIST-02		None	0	1000	110.20.85.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> ROF_H04_MTRG_SPRAY_WATER_FLOW	'A' Vessel Spray Water ...	HIST-02		None	0	1000	110.20.85.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> ROF_H04_MTRG_OFFGAS_TEMP_1		HIST-02		None	0	1000	110.20.85.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> ROF_H04_MTRG_SPRAY_WATER_FLOW	'B' Vessel Spray Water ...	HIST-02		None	0	1000	110.20.85.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> ROF_H04_MTRG_PRIMARY_COMPRESSOR	Analogy Feedback 'X' Va...	HIST-02		DEGREES	0	360	110.20.85.94DASABT...	0:00:00...
<input checked="" type="checkbox"/> ROF_H04_COXENATOR_EV	Vessel 'A' O2 Elev. SCT...	HIST-02		None	0	30000	110.20.85.94DASABT...	0:00:00...

Temperature profiles must more steady  
 No.4 DD much better  
 3/8 elevating above other last 1/2 to  
 last 2/3 of heat

Dust Density levels: 5/8 600AM - 5/8 800AM

Dust Density HISTZ



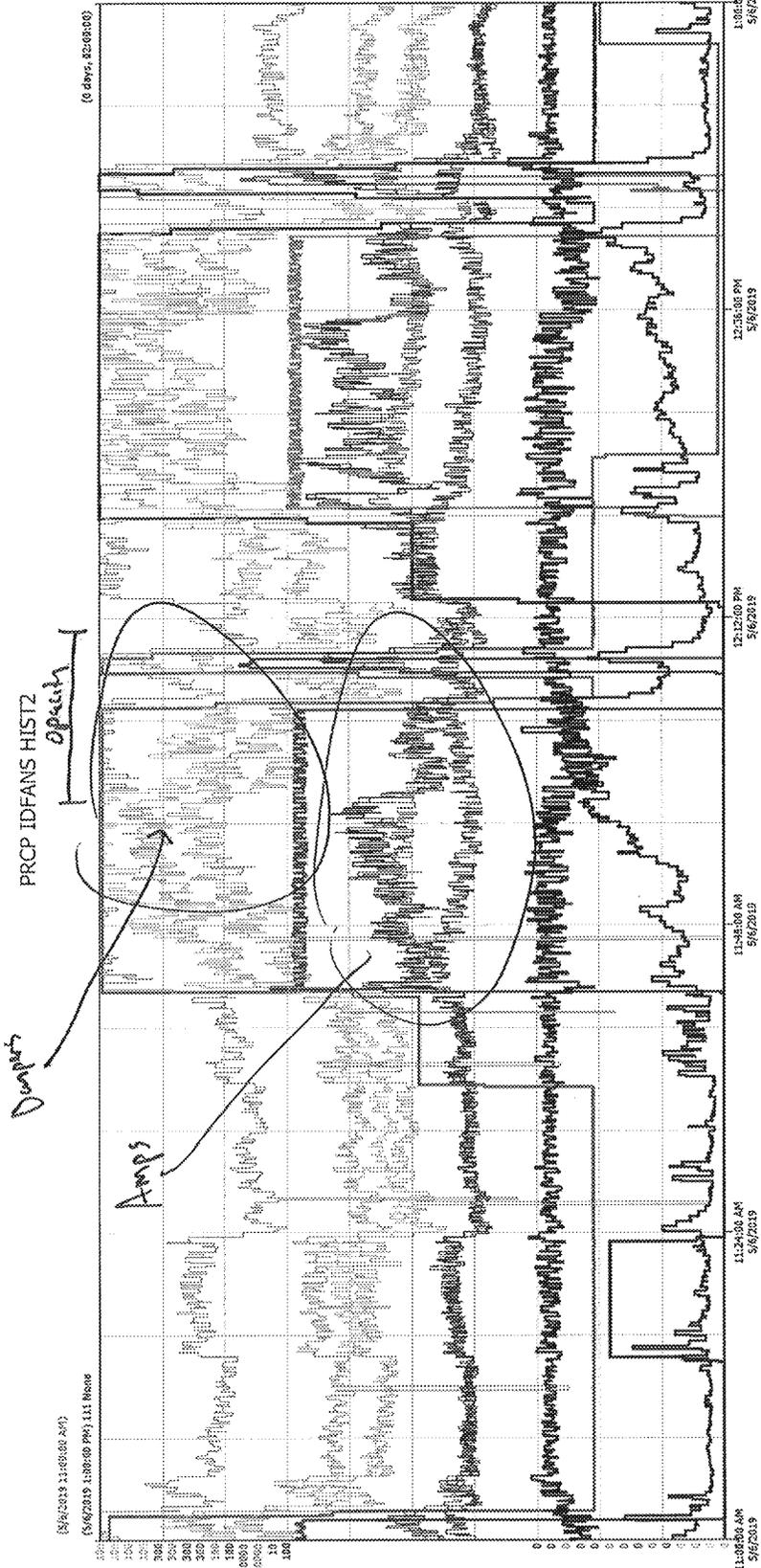
Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
001 BCF_H04_VTRES_OFFGAS_TEMP_1		HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
002 BCF_H04_VTRES_SPRAY_WATER_FLOW	'A' Vessel Spray Water ...	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
003 BCF_H04_VTRES_OFFGAS_TEMP_1		HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
004 BCF_H04_VTRES_SPRAY_WATER_FLOW	'B' Vessel Spray Water ...	HIST-02		None	0	1000	110.20.83.94DASABT...	0:00:00...
005 BCF_H04_VTRES_PrimariesPosition	Analogue Feedback 'A' Yes...	HIST-02		DEGREES	0	100	110.20.83.94DASABT...	0:00:00...
006 BCF_H04_VTRES_CO2Flow_SCE	Vessel 'A' CO2Flow SCE...	HIST-02		None	0	20000	110.20.83.94DASABT...	0:00:00...

3/8 Clearly Elevated 2nd Half Heat

7/18/2019 6:07:28 PM

C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\Dust Density HIST2.aatrend

ESP ID Fan Status: 5/6 2300 - 5/6 1300  
 (00)

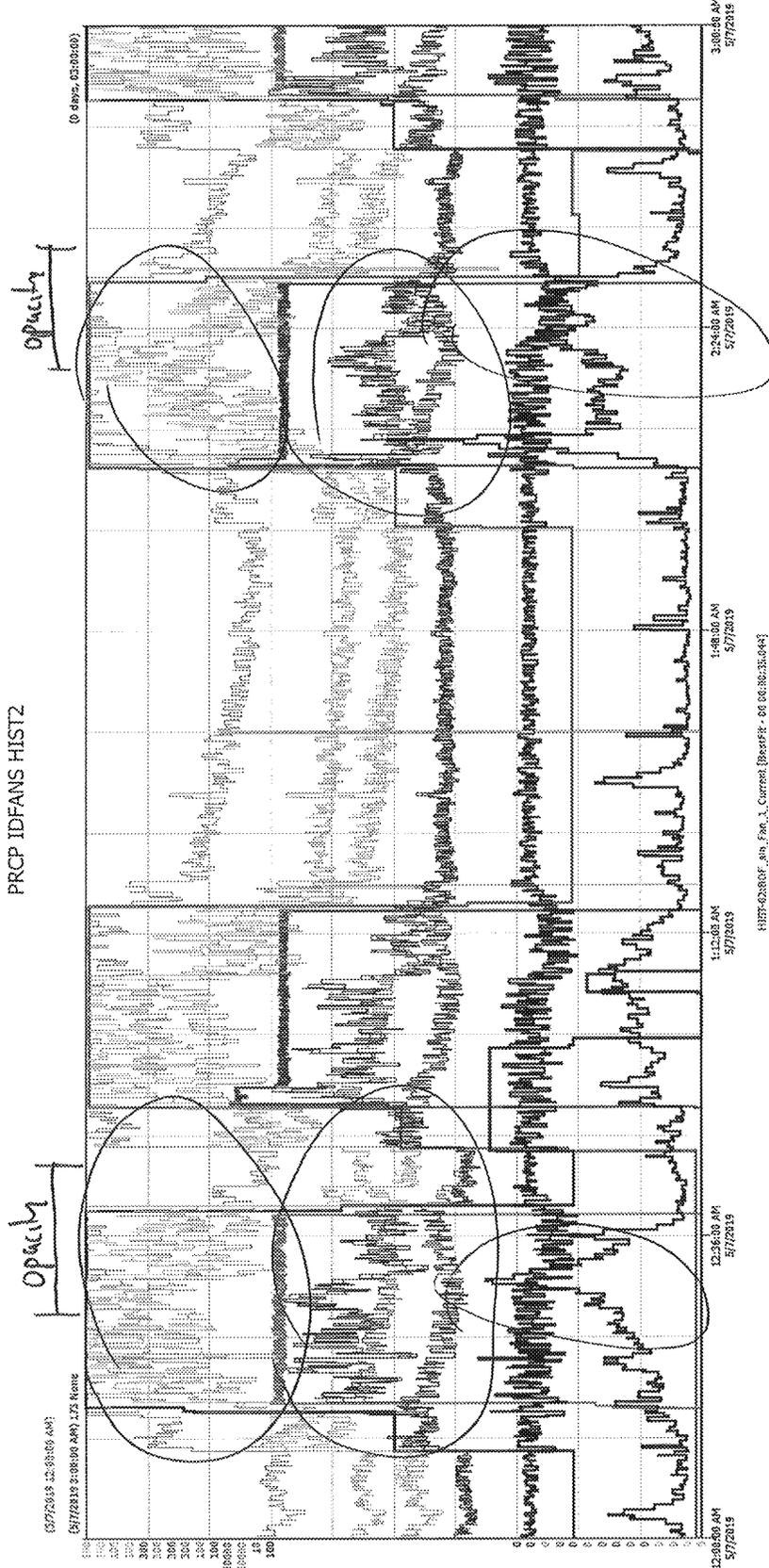


Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> ROP_ah_Fan_1_Current	Precipitator I.D. Fan #...	HIST-02		Amps	0	500	110.20.83.95/0A54BC...	0:00:00...
<input checked="" type="checkbox"/> ROP_ah_Fan_2_Current	Precipitator I.D. Fan #...	HIST-02		Amps	0	500	110.20.83.95/0A54BC...	0:00:00...
<input checked="" type="checkbox"/> ROP_ah_Fan_3_Current	Precipitator I.D. Fan #...	HIST-02		Amps	0	500	110.20.83.95/0A54BC...	0:00:00...
<input checked="" type="checkbox"/> ROP_ah_Fan_4_Current	Precipitator I.D. Fan #...	HIST-02		Amps	0	500	110.20.83.95/0A54BC...	0:00:00...
<input checked="" type="checkbox"/> ROP_IAS_B_EstimateDampersPosition		HIST-02		Dampers	0	100	110.20.83.95/0A54BC...	0:00:00...

All 4 Fans Running  
 Dampers acting as expected

ESP ID Fan status: S/7 000 - S/7 300

PRCP IDFANS HISTZ



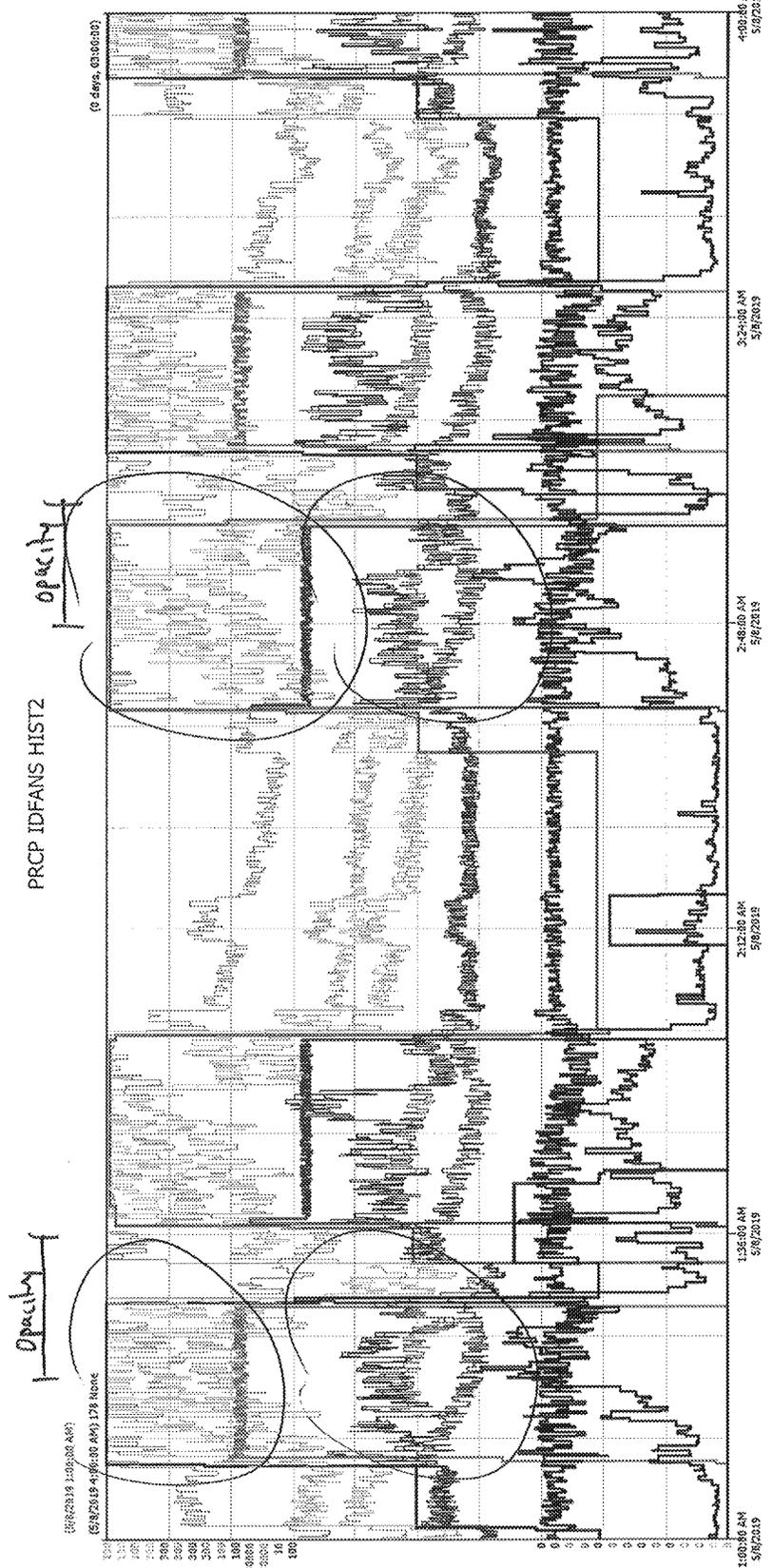
Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> ESP_ID_Fan_1_Current	Predicator I.D. Fan #...	HIST-02	Black	None	0	300	110.20.83.95/0A56EC...	0:00:00...
<input checked="" type="checkbox"/> ESP_ID_Fan_2_Current	Predicator I.D. Fan #...	HIST-02	Black	None	0	300	110.20.83.95/0A56EC...	0:00:00...
<input checked="" type="checkbox"/> ESP_ID_Fan_3_Current	Predicator I.D. Fan #...	HIST-02	Black	None	0	300	110.20.83.95/0A56EC...	0:00:00...
<input checked="" type="checkbox"/> ESP_ID_Fan_4_Current	Predicator I.D. Fan #...	HIST-02	Black	None	0	300	110.20.83.95/0A56EC...	0:00:00...
<input checked="" type="checkbox"/> ESP_IDAS_A_PreviewDamperPosition		HIST-02	Black	None	0	100	110.20.83.95/0A56EC...	0:00:00...
<input checked="" type="checkbox"/> ESP_IDAS_B_PreviewDamperPosition		HIST-02	Black	None	0	100	110.20.83.95/0A56EC...	0:00:00...

All 4 Fans Running  
Dampers acting as expected

7/18/2019 6:10:54 PM

C:\Users\dpate\Desktop\Morning Data Analysis\WW\COMS trends\Investigation Trends\Becca Green Hist Trends\PRCP IDFANS HISTZ.aaTrend

ESP Fan Operation: 5/8 100 - 5/8 400

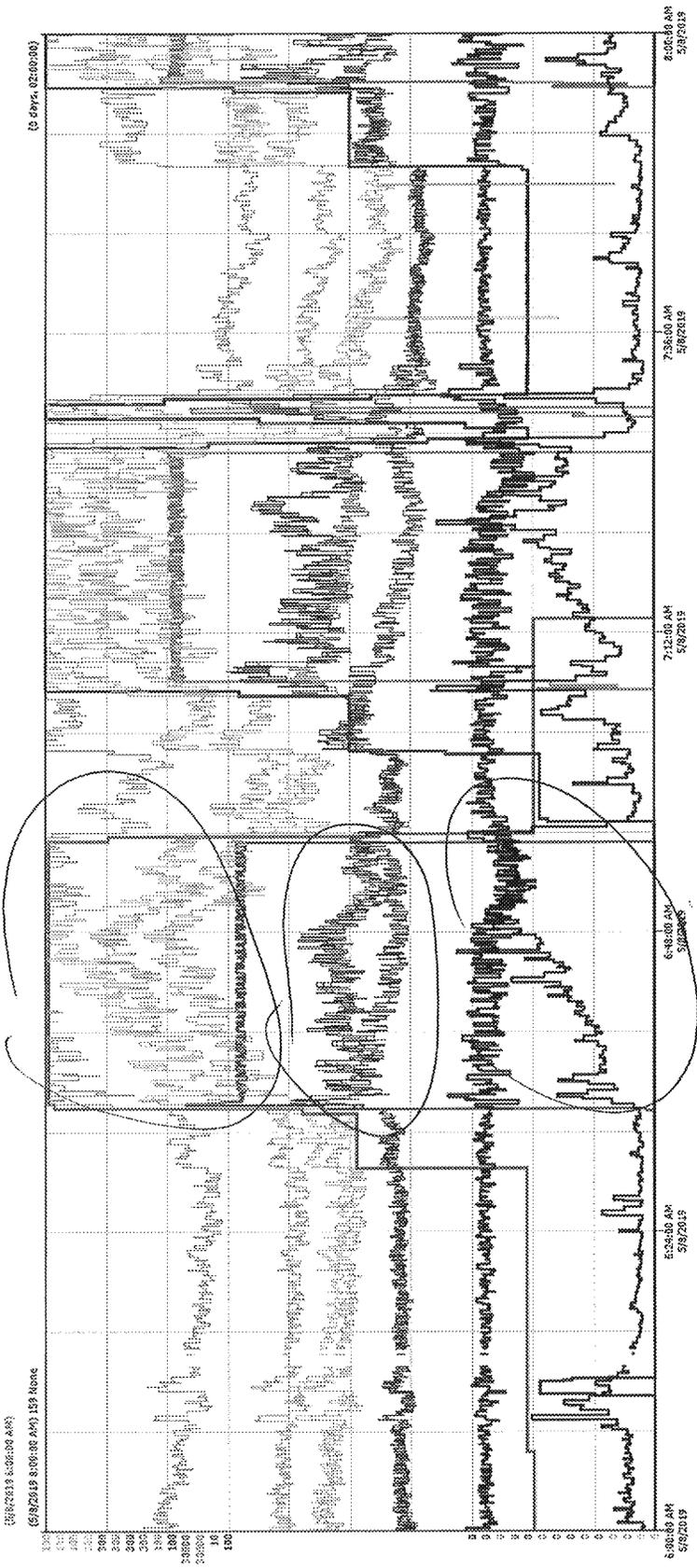


Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> 80F_Am_Fan_1_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	110.20.83.96D45A8C...	000000...
<input checked="" type="checkbox"/> 80F_Am_Fan_2_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	110.20.83.96D45A8C...	000000...
<input checked="" type="checkbox"/> 80F_Am_Fan_3_Current	Precipitator I.D. Fan #...	HIST-03		None	0	300	110.20.83.96D45A8C...	000000...
<input checked="" type="checkbox"/> 80F_Am_Fan_4_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	110.20.83.96D45A8C...	000000...
<input checked="" type="checkbox"/> 80F_Am_Fan_1_PrimaryDampersPosition		HIST-02		None	0	100	110.20.83.96D45A8C...	000000...
<input checked="" type="checkbox"/> 80F_Am_Fan_2_PrimaryDampersPosition		HIST-02		None	0	100	110.20.83.96D45A8C...	000000...

All 4 Fans Running  
Dampers moving as expected

ESP Fan Operation: 5/8 600 AM - 5/8 800 AM

PRCP IDFANS HISTZ



Tag Name	Description	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset
<input checked="" type="checkbox"/> 305 80F_Am_Fan_1_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	190.20.83.95DAS8C...	0:00:00...
<input checked="" type="checkbox"/> 306 80F_Am_Fan_2_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	190.20.83.95DAS8C...	0:00:00...
<input checked="" type="checkbox"/> 307 80F_Am_Fan_3_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	190.20.83.95DAS8C...	0:00:00...
<input checked="" type="checkbox"/> 308 80F_Am_Fan_4_Current	Precipitator I.D. Fan #...	HIST-02		None	0	300	190.20.83.95DAS8C...	0:00:00...
<input checked="" type="checkbox"/> 309 80F_DAS_A_Press/DamperPosition		HIST-02		None	0	100	190.20.83.95DAS8C...	0:00:00...
<input checked="" type="checkbox"/> 310 80F_DAS_B_Press/DamperPosition		HIST-02		None	0	100	190.20.83.95DAS8C...	0:00:00...

A(1 4 Fans Running  
Dampers moving as expected



Date/Time	Instantaneous Opacity	A-Vessel		B-Vessel		A-Vessel Spray Water							B-Vessel Spray Water							Comments					
		Oxygen	Blowrate	Blowrate	Oxygen	8-Bank	9=Bank	1	2	3	4	5	6	7	8-Bank	9=Bank	1	2	3		4	5	6	7	
5/8/2019 2:58:30	20.6	20264		123	76	0	0	0	0	0	7	2	21												3:00 Event
5/8/2019 2:58:45	17.6	20518		95	76	0	0	0	0	0	6	1	0												3:00 Event
5/8/2019 2:59:00	17.1	20312		97	0	0	0	0	0	0	6	1	0												3:00 Event
5/8/2019 2:59:15	19.4	20392		96	0	0	0	0	0	0	6	0	0												3:00 Event
5/8/2019 2:59:30	19.3	20249		96	0	0	0	0	0	0	6	2	0												3:00 Event
5/8/2019 2:59:45	25.5	0		82	0	0	0	0	0	0	5	0	0												3:00 Event
5/8/2019 6:48:00	22.4	20583		135	75	79	78	0	90	100	79	65													6:54 Event
5/8/2019 6:48:15	25.6	20294		133	75	79	78	0	90	100	79	65													6:54 Event
5/8/2019 6:48:30	25.3	20544		135	75	79	78	0	90	100	80	65													6:54 Event
5/8/2019 6:48:45	22.4	20274		135	75	79	77	0	90	100	79	65													6:54 Event
5/8/2019 6:49:00	25.7	20517		134	75	79	78	0	90	100	79	65													6:54 Event
5/8/2019 6:49:15	26.5	20315		135	75	79	79	0	90	100	79	65													6:54 Event
5/8/2019 6:49:30	25.8	20494		134	75	79	78	0	90	100	79	65													6:54 Event
5/8/2019 6:49:45	27.2	20367		135	75	79	79	0	90	100	79	65													6:54 Event
5/8/2019 6:50:00	25.1	20470		134	75	80	77	0	90	100	79	65													6:54 Event
5/8/2019 6:50:15	24.4	20296		134	75	79	78	0	91	101	79	65													6:54 Event
5/8/2019 6:50:30	24.3	20364		134	75	79	78	0	91	101	79	65													6:54 Event
5/8/2019 6:50:45	24.1	20420		133	75	79	78	0	91	101	79	65													6:54 Event
5/8/2019 6:51:00	22.8	20349		134	75	80	78	0	90	100	79	65													6:54 Event
5/8/2019 6:51:15	22.2	20647		134	74	79	78	0	90	100	79	65													6:54 Event
5/8/2019 6:51:30	19.6	20218		134	75	79	78	0	91	100	79	65													6:54 Event
5/8/2019 6:51:45	22.5	20572		135	74	79	78	0	90	101	79	65													6:54 Event
5/8/2019 6:52:00	19.5	20316		117	79	13	80	0	3	104	81	67													6:54 Event
5/8/2019 6:52:15	22.9	20546		117	78	0	81	0	0	104	82	67													6:54 Event
5/8/2019 6:52:30	23.8	20255		118	78	0	56	0	0	105	82	68													6:54 Event
5/8/2019 6:52:45	25.2	20558		120	78	0	0	0	0	105	69	68													6:54 Event
5/8/2019 6:53:00	23.5	20211		121	79	0	0	0	0	107	1	69													6:54 Event
5/8/2019 6:53:15	23.0	20550		122	79	0	0	0	0	106	1	69													6:54 Event
5/8/2019 6:53:30	25.1	20236		122	79	0	0	0	0	70	4	70													6:54 Event
5/8/2019 6:53:45	22.6	20443		123	78	0	0	0	0	1	0	70													6:54 Event



# BOF ESP Operations Shift Checksheet

This form is required to be completed per the Operation and Maintenance Plan for the BOF Electrostatic Precipitator (ESP) which satisfies the requirements of the Iron & Steel MACT rules and has been approved by EPA. All sections of this form MUST be completed. Blank areas are not acceptable. Failure to do so could result in an air permit deviation or Notice of Violation from MDEQ.

	Date	Time	
Shift Start:	5.7.19	08:00	AM/PM
Shift End:	5.7.19	20:00	AM/PM

OPERATOR: E. FLOCKER

PAGE # 1

FILL OUT INFORMATION INSIDE THE BOX ONCE PER SHIFT  
(Note if there are any "NO" answers, note in the corresponding "Comments" section when Maintenance was contacted and known follow up)

*The items within this bold box are required by an air permit, MACT Plan or O&M Plan.*

EQUIPMENT TO BE INSPECTED	Yes	No	COMMENTS
Verification Manometer Reads within +/- 0.2" Water Column to Digital Pressure Transmitter:	<input checked="" type="checkbox"/>		
Verify All Rappers Functioning: If "NO" note numbers Note: If "NO" call BOF Maintenance	<input checked="" type="checkbox"/>		
Verify that the PCAMS is operating properly by checking the following items:			
1) Is the computer on and functioning?	<input checked="" type="checkbox"/>		
2) Is the Rapper program running?	<input checked="" type="checkbox"/>		
3) Are the power levels fluctuating?		<input checked="" type="checkbox"/>	
Are there any opacity/COMS alarms or faults on the LED display? If yes, note the code number and notify Supervisor.		<input checked="" type="checkbox"/>	

ESP Outlet Louvers - NOTIFY SUPERVISOR if outlet louver is <40% open	1	2	3	4	5	6	7	8	North Side	South Side
Time: SOS    % Open	48	30	48	48	0	48	48	50	Empty $\frac{3}{4}$ Full Over Flows	Empty $\frac{3}{4}$ Full
									#5 Empty Full	Heavy Full
									#7 Empty Full	Empty Full

Use the space below for additional comments or alarms observed during the shift

SIL0 HAS 33%

# BOF ESP Operations Shift Checksheet

This form is required to be completed per the Operation and Maintenance Plan for the BOF Electrostatic Precipitator (ESP) which satisfies the requirements of the Iron & Steel MACT rules and has been approved by EPA. All sections of this form MUST be completed. Blank areas are not acceptable. Failure to do so could result in an air permit deviation or Notice of Violation from MDEQ.

	Date	Time	
Shift Start:	5-7-19	2000	AM/PM
Shift End:	5-8-19	0800	AM/PM

OPERATOR: Stokose

PAGE # 1

FILL OUT INFORMATION INSIDE THE BOX ONCE PER SHIFT  
(Note if there are any "NO" answers, note in the corresponding "Comments" section when Maintenance was contacted and known follow up)

*The items within this bold box are required by an air permit, MACT Plan or O&M Plan.*

EQUIPMENT TO BE INSPECTED	Yes	No	COMMENTS
Verification Manometer Reads within +/- 0.2" Water Column to Digital Pressure Transmitter:	<input checked="" type="checkbox"/>		
Verify All Rappers Functioning: If "NO" note numbers Note: If "NO" call BOF Maintenance	<input checked="" type="checkbox"/>		Comp #5 Down
Verify that the PCAMS is operating properly by checking the following items:			
1) Is the computer on and functioning?	<input checked="" type="checkbox"/>		
2) Is the Rapper program running?	<input checked="" type="checkbox"/>		
3) Are the power levels fluctuating?	<input checked="" type="checkbox"/>		
Are there any opacity/COMS alarms or faults on the LED display? If yes, note the code number and notify Supervisor.		<input checked="" type="checkbox"/>	

ESP Outlet Louvers - NOTIFY SUPERVISOR if outlet louver is <40% open	1	2	3	4	5	6	7	8	North Side	South Side
Time: SOS    % Open	48	30	48	50	0	50	50	50	Empty <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Full</span> Over Flows	Empty <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Full</span>
									#5 1/2 Empty <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Full</span>	Heavy
									#7 1/2 Empty <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Full</span>	<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Empty</span> Full

Use the space below for additional comments or alarms observed during the shift

S.O.S. Outlet 39% Comp #5 Down. 4/2.

0564

# AK STEEL DEARBORN WORKS - BOF PRECIPITATOR

## Check Sheet for 6-Minute (>15% 6-Min Average)

This form is required to be completed per the Operation and Maintenance Plan for the BOF Electrostatic Precipitator (ESP) which satisfies the requirements of the Iron & Steel MACT rules and has been approved by EPA. All sections of this form MUST be completed. Blank areas are not acceptable. Failure to do so could result in an air permit deviation or Notice of Violation from MDEQ.

Shift Start:	Date	Time	AM/PM
5-6-19	5-6-19	8	AM/PM
Shift End:	5-7-19	8	AM/PM

Page # /

OPERATOR: Powell  
 SUPERVISOR: RP

Clock Time of 6-Min Opacity (BLOCK) (Military time)	BATCH Numbers	Value of 6-Min OPACTY %	Enter initials of Supervisor Notified	AVC Controllers Reset? (Y/N) (if "Yes" which controllers?)	List Fields with AVC Outages (if none, enter N/A)	List Fields with "LOW POWER ALARMS" if alarms occurred, Power Off Rap after the heat (if none, enter N/A)	Did you POWER OFF RAP after the heat? (Y/N)	ESP Draft Value (inches H2O)		ESP Fan Start Up or Shutdown? (SU / SD) (Enter N/A, if no fan issue occurred)	Fan Failure (Y/N) (Describe event in "Comments" section)	IS AUTOMATIC POWER OFF RAPPING turned ON and ACTIVE? (Y/N) *If not ACTIVE, turn off/on to re-initiate. If still not ACTIVE, call Electrician*	Humidification Stream turned on at event? (Y/N) *If NO, contact Boiler Pulpit*	Spray Water System Operating? (Y/N) *If NO, contact Maintenance*
								Aim	Actual					
2322	58239	16.05	RP	<del>SA</del>	SA	NA	N	2.6	2.6	NA	N	Y	Y	Y
2322	58239	16.33	RP	N	SA	NA	N	2.8	2.9	NA	N	Y	Y	N
0015	58240	16.84	RP	N	SA	NA	N	2.4	2.3	NA	N	Y	Y	Y
0015	58240	20.62	RP	N	SA	NA	N	2.4	2.3	NA	N	Y	Y	Y
0207	58242	18.18	RP	N	SA	NA	N	2.8	2.9	NA	N	Y	Y	X
0207	58242	15.9	RP	N	SA	NA	N	2.8	2.7	NA	N	Y	Y	X
0207	58242	19.4	RP	N	SA	NA	N	2.4	2.4	NA	N	Y	Y	X
Additional Comments or Descriptions of other issues contributing to an event must be described below: (Continue on back of sheet, if necessary)														
2342	58239	16.8	RP	N	C-5/4D	N/A	N	2.4	2.4	N/A	N	Y	Y	Y
230	58242	20.9	RP	N	C-5/4D	N/A	N	2.5	2.4	N/A	N	Y	Y	Y

**AK STEEL DEARBORN WORKS - BOF PRECIPITATOR  
Check Sheet for 6-Minute (>15% 6-Min Average)**

This form is required to be completed per the Operation and Maintenance Plan for the BOF Electrostatic Precipitator (ESP) which satisfies the requirements of the Iron & Steel MACT rules and has been approved by EPA. All sections of this form **MUST** be completed. Blank areas are not acceptable. Failure to do so could result in an air permit deviation or Notice of Violation from MDEQ.

Date	Time
Shift Start: 5-7-19	2000 AM/PM
Shift End: 5-8-19	0800 AM/PM

OPERATOR: Stokes  
SUPERVISOR: George

Clock Time of 6-MIN > 15% Opacity (BLOCK) (Military time)	BATCH Numbers	Value of 6-Min OPAACITY %	Enter initials of Supervisor Notified	AVC Controllers Reset? (Y/N) (if "Yes" which controllers?)	List Fields with AVC Outages (if none, enter N/A)	List Fields with "LOW POWER ALARMS" if alarms occurred, Power Off Rap after the heat (if none, enter N/A)	Did you POWER OFF RAP after the heat? (Y/N)	ESP Draft Value (inches H2O)		ESP Fan Start Up or Shutdown? (SU / SD) (Enter N/A, if no fan issue occurred)	Fan Failure (Y/N) (Describe event in "Comments" section)	IS AUTOMATIC POWER OFF RAPPING turned ON and ACTIVE? (Y/N) *If not ACTIVE, turn off/on to re-initiate. If still not ACTIVE, call Electrician*	Humidification Steam turned on at event? (Y/N) *If NO, contact Boiler Pulpit*	Spray Water System Operating? (Y/N) *If NO, contact Maintenance*
								Aim	Actual					
* 1954	58215	16.7	G	N	N/A	N/A	N	2.4	2.5	N/A	N	Y	Y	Y
- 0036	58271	16.6		N	N/A	N/A	N	2.8	2.7	N/A	N	Y	Y	Y
0124	58272	30.5		N	N/A	N/A	N	2.5	2.6	N/A	N	Y	Y	Y
0130	1	25.5		1	1A	1A	N	2.8	2.9	1	1	Y	Y	Y
0134	58273	18.0		1	N/A	N/A	Y	2.4	2.4	N/A	N	Y	Y	Y
0200	1	15.8		1	1	1	Y	2.7	2.7	1	1	Y	Y	Y
0248	58274	19.2		1	N/A	N/A	N	2.5	2.7	N/A	N	Y	Y	Y
Additional Comments or Descriptions of other issues contributing to an event must be described below: (Continue on back of sheet, if necessary)														
* Note: Took 6 min. Delay for Power Shift, Rapped during Delay - 4:5 and Delay.														
0254	1	27.5		1	1A/3A	1A/3A	1	2.4	2.4	1	1	Y	Y	Y
0300	1	25.0		1	1A/3A	1A/3A	1	2.8	2.7	1	1	Y	Y	N
(Outdr-switching)														

**AK STEEL DEARBORN WORKS - BOF PRECIPITATOR  
Check Sheet for 6-Minute (>15% 6-Min Average)**

This form is required to be completed per the Operation and Maintenance Plan for the BOF Electrostatic Precipitator (ESP) which satisfies the requirements of the Iron & Steel MACT rules and has been approved by EPA. All sections of this form MUST be completed. Blank areas are not acceptable. Failure to do so could result in an air permit deviation or Notice of Violation from MDEQ.

Shift Start:	5-7-19	2000	AM/PM
Shift End:	5-8-19	0800	AM/PM

OPERATOR: Stokes  
SUPERVISOR: George

Clock Time of 6-MIN > 15% Opacity (BLOCK) (Military time)	BATCH Numbers	Value of 6-Min OPAQITY %	Enter Initials of Supervisor Notified	AVC Controllers Reset? (Y/N) (if "Yes" which controllers?)	List Fields with AVC Outages (if none, enter N/A)	List Fields with "LOW POWER ALARMS" if alarms occurred, Power Off Rap after the heat (if none, enter N/A)	Did you POWER OFF RAP after the heat? (Y/N)	ESP Draft Value (inches H2O)		ESP Fan Start Up or Shutdown? (SU / SD) (Enter N/A, if no fan issue occurred)	Fan Failure (Y/N) (Describe event in "Comments" section)	Is AUTOMATIC POWER OFF RAPPING turned ON and ACTIVE? (Y/N) *If not ACTIVE, turn off on to re-initiate. If still not ACTIVE, call Electrician*	Humidification Steam turned on at event? (Y/N) *If NO, contact Boiler Pulpit*	Spray Water System Operating? (Y/N) *If NO, contact Maintenance*
								Aim	Actual					
0312	58275	21.5	G	N	N/A	N/A	N	2.8	2.9	N/A	N	Y	Y	Y
0324	1	18.3		N	Sup 28 HD	1	Y	2.4	2.4	1	1	Y	Y	Y
0454	58277	15.9		N	N/A	N/A	Y	2.8	8.1	N/A	Y	Y	Y	N
0554	58278	34.3		N	N/A	N/A	Y	2.8	2.7	N/A	Y	Y	Y	N
0648	58279	18.0		N		N/A	Y	2.4	2.4	N/A	Y	Y	Y	Y
0656	1	23.8		1	1A	N/A	Y	2.5	2.5	1	1	Y	Y	Y
0724	58280	19.5		N	N/A	N/A	N	2.4	2.3	N/A	Y	Y	Y	Y
Additional Comments or Descriptions of other issues contributing to an event must be described below: (Continue on back of sheet, if necessary)														
0448	58277	15.7	G	N	CS/HD	N/A	Y	2.4	2.5	N/A	N	Y	Y	Y
0548	58278	22.1	G	N	CS/HD	Y	Y	2.8	2.8	N/A	N	Y	Y	Y